troff and friends

markus schnalke <meillo@marmaro.de>

this talk

- history and background
- theory
- practical usage

... of `nroff`, `troff`, and friends (`tbl`, `eqn`, `refer`, `pic`)

please interrupt me at any time in case of questions

please tell me what I should demonstrate

goal: motivate to learn and use these programs

my troff history

years ago	first contact through man pages
	a simple document, just to try it
a year ago	used `pic` for my diploma thesis
two months ago	started to learn `troff` better

thus: It's all pretty new to me too :-)

historical background

see my talk on "old software treasuries"

quick summary:

- terminal = keyboard + line printer
- no screen orientation
- size limits on software

history of typesetting

- completely by hand
- "hot metal" typesetting (Linotype)
- completely by computers (line printers and photo-typesetters)

goal: text automatically right-adjusted and hyphenated

history of troff

early 60s at MIT:

- `RUNOFF` for CTSS
- "right-justifying type-out program"
- ported to many systems (also MULTICS)

around 1970 at Bell Labs:

- `roff` by McIlroy (Unix version of `RUNOFF`)
- used daily

history of troff (2)

`nroff` ("new roff")

- by Joe Ossanna
- strength: macro programmable
- still only for daisy wheel/golf ball printers

`troff` ("typesetting roff"?)

- superset of `nroff`
- written when Bell Labs got a phototypesetter
- supports different fonts, font sizes, more characters, ...
- basically the same program as `nroff` with different output

glossary

- word processing
- text formating
- document preparation
- typesetting

and: `nroff`, `ditroff`, `troff`, `otroff`

`groff` is the GNU implementation of `troff` and friends

TeX

Differences:

	metaphor	basic entity
troff	hand composer	line
TeX	raster image	paragraph

Heirloom `troff` does also include paragraph-at-once adjustment, hanging characters, and micro typography

but no question, TeX is great software!
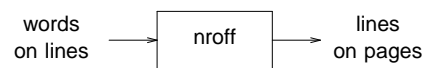
nroff

nroff

Input consists of:

- command lines (match to /^[.']/)
- input lines (everything else)
- plus escape sequences (introduced with backslash)

Unrecognized commands are simply ignored

All commands and names are one or two characters

nroff (2)

overview

words
on lines $\longrightarrow$ nroff $\longrightarrow$ lines
on pages

nroff does:

- filling ($\rightarrow$ hyphenation)
- adjusting ($\rightarrow$ adding inter-word spaces)

number registers

- own namespace
- set with: `.nr XY 42`
- substitute value: `\n(XY`
- increment, decrement in defineable steps possible
- defineable format: `.af XY 0001` (1, 0001, i, I, a, A)
- remove register: `.rr XY`

<nroff demo>

strings

- namespace together with macros and diversions
- set with: `.ds AB "foo`
- substitute value: `\*(AB`
- append: `.as AB "bar`
- rename: `.rn AB CD`
- remove: `.rm AB`
- may contain escape sequences

(diversions collect text for later insertion – not covered here)

macros

- share namespace with strings and diversions
- define:

```
.de AB
.  \" number of arguments: \n(.$
.  \" first argument: \$1
..
```

- append with: `.am`
- rename and remove like with strings
- add backslashes to delay interpretation
- may be nested

if

two kinds:

- `.if` with only one branch
- `.ie` and `.el` with two branches

true is:

- `!` false
- `'foo'foo'`
- non-negative number (-1 is false!)
- valid numeric comparison
- `e/o` and `t/n` in the matching cases

multiline branches with `\{` and `\}`

<nroff demo>

troff

troff

a `nroff` for phototypesetters

supports:

- high resolution and small movements
- different fonts
- different font sizes
- special characters

troff

two kinds:

- `.if` with only one branch
- `.ie` and `.el` with two branches

true is:

- `!` false
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multiline branches with `\{` and `\}`

macro packages

macro packages

- principally not different from normal input
- get prepended to the normal input
- searched for at a central location
- usage: `troff -ms input.ms`
  (is the same as: `troff s input.ms`)
- multiple macro packages for one document possible, but beware conflicts
- well known macro packages are: ms, mm, me, man

ms

- the standard macros
- developed for Bell Labs internal documents
- superseded by mm
- easy to learn
- used for these slides

man

- the man page macros
- that's what you use when you write man pages
- stripped down to this specific task

slides

- came from Sape Mullender over Uriel to me
- `http://repo.cat-v.org/troff-slider/sample_slides.ms`
- I took `.SS` and `.IT` and added `.PA`, that's all
- could be improved ... and I plan to do that to learn more about troff ;-)
- these slides are created with those macros, of course

<macros demo>

preprocessors

preprocessors

- add "features" to `troff`
- work only on text between start and end markers
- copy everything else through
- they are a very nice concept to extend software!

write your own preprocessor (in the language of your choice) if you want to add some functionality

tbl

by Mike Lesk

example code:

```
.TS
center box;
lfB | cfB | cfB
l | c | c.
tab     separated      fields
=
several lines   of data
_
last    format  applies
_
to all  further lines
.TE
```

eqn

- by Kernighan and Cherry
- the first preprocessor
- would hardly exist without `yacc`
- write formulas as spoken in English
- Greek letters and math symbols available
- inline formulas possible with `delim $$`

example:

```
x sub {1,2}~=~{ -b ~+-~ sqrt { b sup 2~-~4 a c } } over { 2 a }
```

$$x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

refer

- by Mike Lesk
- for literature references (like `bibtex` for LaTeX)
- but does a "fuzzy" search
- macro package needs to support `refer`

example:

```
.[
words unique to the referenced document
.]
```

sample database entry:

```
%T Title
%A Author
%D Date of publication
%I Issuer
```

pic

- by Kernighan
- draw diagrams by "explaining" them
- impressed me much

example:

```
.PS
ED: box "ed"
arrow right
box "ex"
arrow
box "vi"
arrow up right from ED.ne
box "grep"
arrow down right from ED.se
box "sed"
.PE
```

further stuff

postprocessors

`dpost`

- for `troff`
- converts device independent output to PostScript

`col`

- for `nroff`
- removes backward movements (primary for multi column text)

doctype

- frequent question: which preprocessors are needed?
- `doctype` gives the answer
- introduced in "The Unix Programming Environment"
- a script, mainly in `awk`
- easy to extend to personal needs

literature

- "**Text Processing and Typesetting with Unix**" by Barron and Rees explains everything pretty good (focus on `nroff`)

- "**Heirloom Documentation Tools Nroff/Troff User's Manual**" by Ossanna, Kernighan, and Ritter is more a technical reference

- Various documents collected on `http://troff.org`

this talk was prepared using tools of the Heirloom project: `http://heirloom.sf.net`

the slides macros were taken from `http://repo.cat-v.org/troff-slider/`

all editing was done with `ed`, of course :-)

the slides and examples are available on my website `http://marmaro.de/docs` and on `http://ulm.ccc.de/ChaosSeminar/`

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